

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 22

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte WOLFGANG M. STROBEL
and ROBERT J. LOCKHART

Appeal No. 2002-1050
Application 09/425,505

ON BRIEF

Before COHEN, STAAB, and MCQUADE, Administrative Patent Judges.
MCQUADE, Administrative Patent Judge.

DECISION ON APPEAL

Wolfgang M. Strobel et al. appeal from the final rejection of claims 1 through 5, all of the claims pending in the application.

THE INVENTION

The invention relates to "a method of providing offset compensation to a cutting blade to counter deviation and offset of the cutting path resulting from deflection forces exerted on the blade tip" (specification, page 1). Representative claim 1 reads as follows:

1. A method of cutting planar production material with a controlled cutting machine having a cutting tool with a tool tip and which machine moves the tool in response to control data defining commanded cutting paths, said method comprising the steps of:

performing cutting tests on various planar test materials with the cutting machine under selected cutting conditions using test control data defining commanded test cutting paths whereby deflection forces are produced on the tool due to the interaction of the tool and materials so as to cause the tool tip to move along actual test cutting paths laterally offset from the commanded test cutting paths, and determining compensating lateral directional offsets needed to align the actual test cutting paths with the commanded test cutting paths;

establishing a schedule of the compensating lateral directional offsets needed to align the actual test cutting paths with the commanded test cutting paths as determined by the cutting tests, the schedule to be repeatedly used thereafter for cutting planar production material having cutting conditions associated with the schedule; and

cutting planar production material thereafter by advancing the cutting tool and planar material relative to one another with said machine operating in response to production control data defining commanded production cutting paths and using said schedule of compensating lateral directional offsets to modify the production control data to cause the paths followed by the cutting tool to be said commanded production cutting paths.

THE PRIOR ART

The references relied on by the examiner to support the final rejection are:

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|------------------------|-----------|---------------|
| Gerber | 4,140,037 | Feb. 20, 1979 |
| Tucker et al. (Tucker) | 5,890,524 | Apr. 6, 1999 |

THE REJECTIONS

Claims 1 through 4 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Gerber.

Claim 5 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Gerber in view of Tucker.

Attention is directed to the appellants' main and reply briefs (Paper Nos. 15 and 18) and to the examiner's answer (Paper No. 16) for the respective positions of the appellants and the examiner with regard to the merits of these rejections.

DISCUSSION

I. The 35 U.S.C. § 102(b) rejection of claims 1 through 4

On page 3 in the main brief, the appellants state that "Claims 1-4 stand or fall together." Accordingly, pursuant to 37 CFR § 1.192(c)(7) we have selected representative claim 1 from the group and shall decide the appeal as to the § 102(b) rejection on the basis of this claim alone. In other words, claims 2 through 4 stand or fall with claim 1.

Turning now to the merits of the rejection, Gerber discloses an automatically controlled cutting machine for cutting single or multi-ply fabric layups in accordance with pre-established cutting paths. In general, the cutting machine 10 comprises a cutting table 22 having a bed of bristles 24 for supporting a layup L, a reciprocating blade 20 (or alternatively a band blade or a rotary blade) positioned over the bed, an X-carriage 26 driven by an X-drive motor 34 and a Y-carriage 28 driven by a

Y-drive motor 36 for moving the cutting blade 20 along a desired cutting path P, and a computer/controller 12 for controlling the operation of the machine.

Gerber recognizes that there are special circumstances or conditions that render the fundamental commands used by the controller to translate the cutting blade inadequate to produce high quality, high accuracy cutting. As described in the reference,

FIG. 2 illustrates a cutting blade 20 from the rear as it advances through the layup L of sheet material spread on the bed 24 comprised of bristles. Forces F generated between the advancing cutting blade and material are shown operating on the left side of the blade to produce an unbalanced lateral loading or force which bends and deflects the blade to the position illustrated in phantom. It will be readily apparent that the lower plies of the sheet material cut by the blade when it is deflected will have a slightly different shape or contour than the upper plies due to the blade bending. Obviously, such bending and its results are undesirable when pattern pieces and other products should be cut with high accuracy.

The forces F generated on the cutting blade as it advances can be attributed to a number of factors, such as the layup, the strength of the cloth fibers, the angle of the fibers and cutting path, the sharpening angle of the blade, the sharpness of the blade and others [column 4, line 62, through column 5, line 12].

To deal this deflection problem, Gerber advances the following solution:

[i]nitially, cutting tests are performed on the sheet material with the cutting machine by moving the blade, and sheet material relative to one another in

cutting engagement. . . . The tests are conducted under selected cutting conditions which in general produce low accuracy cuts, and then special or supplemental motions of the blade and material, which aid the cutting blade and improve the overall performance of the cutting machine are determined.

After a plurality of cutting tests have been conducted, and the precise special motions have been determined, a schedule of the special motions correlated with the selected cutting conditions is established. The schedule is recorded in a memory in the automatically controlled cutting machine or elsewhere for future use. During subsequent cutting operations, the cutting blade and sheet material are moved relative to one another along a desired cutting path, and the schedule of special motions is utilized as the corresponding cutting conditions arise. Thus, if for example, the schedule has been recorded in a computer memory which controls the cutting operation, the special motions can be combined with the more fundamental motions calculated or otherwise generated by the computer whenever the computer recognizes one or more of the selected cutting conditions or whenever the machine is commanded to use the special motions by the machine operator who recognizes the special cutting conditions [column 2, lines 36 through 64].

The special corrective motions contemplated by Gerber are yawing motions:

[t]he unbalanced lateral forces on the blade can be counteracted by supplementing the fundamental blade motions with yaw so that the cutting blade is oriented at a slight angle to the cutting path which it traverses, the yaw or rotation occurring about an axis generally perpendicular to the sheet material and directing the blade slightly to one side of the cutting path from which the unbalanced forces are applied. By yawing the cutting blade a preselected amount as the blade advances along the cutting path, the accuracy with which the desired cutting path is tracked can be improved. For optimum overall performance, the amount

of the yaw should be determined with some accuracy
[column 5, lines 32 through 44].

Anticipation is established only when a single prior art reference discloses, expressly or under principles of inherency, each and every element of a claimed invention. RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984). As framed by the appellants, the dispositive issue with respect to the anticipation rejection of claim 1 is whether Gerber meets the claim limitations relating to the "compensating lateral directional offsets."

The examiner submits (see page 4 in the answer) that these limitations find response in Gerber's description of the corrective yawing motions because these motions produce lateral directional offsets of the tip or cutting edge of the cutting blade.

The appellants dispute this assessment of the claim limitations at issue and the Gerber disclosure, arguing that

[Gerber's] yaw or orientation of the blade about its vertical axis, as shown in FIG. 8, is adjusted to counteract lateral forces exerted on the blade in order to straighten the blade and thereby ensure that the desired cutting path is the same as the actual cutting path. In other words, it is the orientation of the blade about its vertical axis, rather than a compensating lateral directional offset (i.e., moving the blade in a direction offset from the desired

cutting path) that ensures that the actual cutting path coincides with the desired cutting path.

. . . The goal of the claimed invention, in part, is not to straighten the blade as in Gerber '037, but rather to direct the cutting apparatus along a directional offset so that the tip of the bent blade moves along the desired cutting path [main brief, page 4].

To emphasize their point, the appellants further maintain that

Gerber '037 is not solving the directional problem by moving the blade in an offset direction, but rather by rotating the orientation of the reciprocating cutting blade about its θ -axis.

. . . [T]he last step of claim 1 generally recites using directional offsets to affect the path of the "cutting tool". In other words, it is the entire cutting tool that is moved in an offset direction. Moving the entire cutting tool in an offset direction includes its central vertical axis [reply brief, pages 1 and 2].

During patent examination claims are given their broadest reasonable interpretation consistent with the underlying specification without reading limitations from the specification into the claims. In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969). The appellants' specification (see page 7) does indicate that the cutting tool is moved along a path that is offset from the desired cutting path in a direction opposite to an offset direction otherwise caused by deflection forces exerted on the cutting tool tip to thereby compensate for the

deflection and align the actual cutting path with the desired cutting path. In other words, the entire cutting tool is moved in an offset direction to compensate for the deflection of the tool tip. Claim 1, however, neither requires such movement nor excludes movement which straightens the tool rather than compensates for its deflection. The appellants' position to the contrary rests on an improper reading of limitations from the specification into the claim. As indicated above, Gerber's test-determined compensatory yawing motions, which counteract unbalanced "lateral" forces tending to deflect the cutting tool tip laterally of the commanded cutting path (see Figure 2), supplement the fundamental cutting tool motions by "directing the blade slightly to one side of the cutting path from which the unbalanced forces are applied" (column 5, lines 37 through 39, emphasis added). Given the ordinary and accustomed meaning of the term "lateral," Gerber's directing of the blade or tool "to one side of the cutting path" constitutes a compensating "lateral" directional offset to the extent broadly required by claim 1. In this regard, Webster's New Collegiate Dictionary (G. & C. Merriam Co. 1977) defines "lateral" as meaning "of or relating to the side: situated on, directed toward, or coming from the side." This definition, which is entirely consistent

with the appellants' specification, reads on the compensating directional offsets disclosed by Gerber.

Hence, the appellants' contention that the limitations in claim 1 relating to the "compensating lateral directional offsets" distinguish the subject matter recited in the claim over Gerber is not persuasive. We shall therefore sustain the standing 35 U.S.C. § 102(b) rejection of claim 1, and claims 2 through 4 which stand or fall therewith, as being anticipated by Gerber.¹

II. The 35 U.S.C. § 103(a) rejection of claim 5

Dependent claim 5 defines the cutting tool recited in parent claim 1 as a rotary cutting tool, and the cutting conditions recited in claim 1 as including the rotating speed of the cutting tool and the number of flutes thereon.

Conceding that Gerber's rotary blade embodiment lacks flutes, the examiner seemingly relies on Tucker's disclosure of a router having a fluted bit 32 to conclude that it would have been obvious to employ such a fluted bit in place of Gerber's cutting

¹ In the event of further prosecution, the examiner should consider whether claim 2 is consistent with the related disclosure on page 7 in the specification.

tool, and to utilize the number of flutes as a cutting condition.²

As convincingly argued by the appellants (see pages 2 and 3 in the reply brief), however, Gerber's corrective yawing motions are incompatible with a rotating cutting tool of the sort disclosed by Tucker. The examiner's attempt to overcome this incongruity by proposing that it would have been further obvious to modify Gerber's corrective motions to accommodate Tucker's tool (see page 5 in the answer) lacks the requisite evidentiary support and clearly stems from an impermissible hindsight reconstruction of the claimed invention.

Thus, we shall not sustain the standing 35 U.S.C. § 103(a) rejection of claim 5 as being unpatentable over Gerber in view of Tucker.

SUMMARY

The decision of the examiner to reject claims 1 through 5 is affirmed with respect to claims 1 through 4 and reversed with respect to claim 5.

² In explaining the rejection (see page 3 in the answer), the examiner neglects to set forth exactly how Gerber and Tucker are intended to be combined.

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No time period for taking any subsequent action in
connection with this appeal may be extended under 37 CFR
§ 1.136(a).

AFFIRMED-IN-PART

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| IRWIN CHARLES COHEN |) | |
| Administrative Patent Judge |) | |
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| |) | BOARD OF PATENT |
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| LAWRENCE J. STAAB |) | |
| Administrative Patent Judge |) | INTERFERENCES |
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